TEST PROCEDURE

TP 502B	
Title Gas Cylinder Change	**Page Number** 1 of 8
Originator N/A	**Supersedes** TP 502A
Responsible Organization Engineering Operations Division (EOD)	**Computer Program** N/A
Type of Test Report N/A	**Data Form Number** N/A
Report Distribution N/A	**Implementation Date** 09-30-94

Implementation Approval

Original Test Procedure Authorized by EPCN #155 on 06-06-94

Revision Description

(1) 09-30-94 The purpose of this change is to revise the procedure as described in EPCN #170.

Note: Specific brand names in EPA/EOD procedures are for reference only and are not an endorsement of those products.

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1. Purpose

The purpose of this procedure is to replace compressed gas cylinders as they are used.

2. Test Article Description

All gas cylinders used as span, zero, Flame Ionization Detector (FID) air and FID fuel arrangedin single cylinders, 12-, 6-, and 4-packs, when the pressure reading reaches the points specified in Step 7.1, and liquid nitrogen when the cylinder is approximately 1/4 full.

3. References

3.1 Environmental Protection Agency (EPA) Laboratory Safety Manual

3.1.1 “Safe Handling of Compressed Gases”

3.1.2 “Cylinder Safety”

3.1.3 “Emission Testing Gases”

3.1.4 “Other Gases used in MVEL”

3.1.5 “Using Test Gases”

3.2 “Federal Register,” Vol. 43, No. 124, Section 86.114

4. Required Equipment

4.1 Open-end wrenches for loosening regulator fittings

4.2 Cylinder carts with restraining chains

4.3 Leak detector solution (SNOOP)

4.4 TP 205, Span Point Change Notice

5. Precautions

5.1 Cylinders containing compressed gases must be handled with extreme care. All technicians must be familiar with the EPA Laboratory Safety Manual, especially the sections entitled “Safe Handling of Compressed Gases” and “Cylinder Safety,” particularly the 30 rules for the safe handling, storage, and use of compressed gas cylinders.

5.2 Because of the dangerous properties of some testing gases, all technicians must be familiar with the EPA Laboratory Safety Manual sections entitled “Emission Testing Gases” and “Other Gases used at MVEL.”

Particular attention should be paid to the symptoms and first-aid treatment for exposure to toxic gases.

5.3 Changing a gas cylinder requires safe handling of the valve protective cap, cylinder valve, and pressure regulator. The mishandling of these devices could result in severe personal injury and/or property damage.

All technicians must be familiar with the EPA Laboratory Safety Manual section entitled “Using Test Gases.”

5.4 NOx cylinders with less than 250 psi may give unstable readings and should not be used for testing. The team leader should be immediately notified if a NOx cylinder pressure falls below 250 psi.

6. Visual Inspection

All hoses and fittings should be inspected for damage prior to the change.

7. Test Article Preparation

7.1 Determine the necessity of a cylinder change.

7.1.1 Replace all single cylinders when the pressure reaches less than 300 but greater than 100 psi.

7.1.2 Replace all 12-, 6- and 4-packs, except NOx, when the pressure reaches 150-100 psi. NOx cylinders should be replaced before the psi reaches 250, due to the unstable characteristic of this gas at low pressure.

7.1.3 Refill the liquid nitrogen tank when the gas level indicator on top of the cylinder reads approximately 1/4 full.

Because this reading is not always reliable, the technician's judgment, based on his/her experience, is the best method for determining when a liquid nitrogen tank should be ordered.

7.2 Determine which type of gas must be replaced. If a FID fuel needs replacing, be sure to verify it is H2He.

7.3 Notify the C&M Gas Lab prior to the gas cylinder change.

7.3.1 When possible, 24 hours advance notice should be given prior to changing any gas cylinders except liquid nitrogen.

7.3.2 Three days advance notice should be given prior to changing the liquid nitrogen cylinders.

7.4 Inform the appropriate site operators in advance that a cylinder change is to be made, specifying which cylinder. The change must be coordinated so that it does not interfere with any tests.

7.4.1 If a span gas cylinder is being changed, analysis site operators must first obtain a good zero-span-zero for that gas and range, noting on the analyzer strip chart that this reading was obtained from the old cylinder.

7.4.2 The analyzer is then returned to span and the strip chart is left running while the cylinders are changed. The analysis site operators should then refer to Step 120.

8. Test Procedure

The following sequence applies to all compressed gas cylinders except liquid nitrogen, which is transported and changed by the C&M Gas Lab.

101 Select the correct cylinder from the gas storage room.

102 Read all stickers and labels for cylinder contents.

103 All span gas cylinders must have EPA bottle concentration labels on the side (green tape stickers).

104 Color codes painted on the cylinders by the vendors should never be relied upon for contents identification, since they vary from vendor to vendor.

105 Transport cylinders to the analysis site gas distribution area using a gas bottle cart with restraining chains attached across the cylinders.

106 Check that the steel protective cap is screwed snugly over the valve before moving the cylinder. Never move a cylinder without a protective cap in place.

107 Cylinders must never drop or bump against each other. Do not allow objects to fall on them.

108 Cylinders must always be moved on carts. Never drag, roll, or slide cylinders, even for short distances. Spin-rolling cylinders on their bases should be avoided.

109 Keep the cylinders away from heat and electrical sources.

110 Make sure that the cylinders are securely chained to the cart before and during transportation.

111 Close the main cylinder service valves of the empty cylinders and wait for the gas to bleed from the system.

Wait until both the primary and secondary pressure readings on the regulator drop to zero before loosening the connecting fittings.

112 For single cylinders, remove the regulator by loosening the connecting fitting with the proper size open-end wrench.

For 12-, 6-, and 4-packs, remove the regulator by holding the CGA “Tee” with one wrench and loosening the connecting fitting with another. Screw the valve protective caps onto the empty cylinders.

Place the empty cylinders onto the transporting cart and secure them with the restraining chain.

113 Position the full cylinders into place and secure them to the wall. Remove the valve protective caps.

114 For single cylinders, attach the regulator to the full cylinder by tightening the connecting fitting with the proper size wrench until it is snug.

For 12-, 6-, and 4-packs, attach the regulator by holding the CGA "Tee" with one wrench and tightening the connecting fitting with another until it is snug.

Do not overtighten the fitting.

115 Slowly and carefully turn open the main valves of the full cylinders. Do not stand in front of the regulator while performing this operation.

116 Check all fittings including the main cylinder valves with leak detector solution.

117 If a leak is suspected, immediately turn off the main valves and proceed with established safety procedures, outlined in the EPA Laboratory Safety Manual.

118 If there are no leaks, check to see that the secondary pressure points on the regulators read as follows:

all span gases - 30 psi
zero gases - 35-40 psi
FID bottles - 30 psi

If the secondary pressure gauge is incorrect, adjust it to the desired setting by turning the regulator pressure control valve.

119 Inform analysis site operators when the change is completed.

If a span gas is being changed, operators must allow the strip chart reading to return to a stable span after the new cylinder is turned on, noting on the strip chart that the new span bottle has been installed. TP 205 should then be completed.

120 Remove the green adhesive tape from the empty cylinder and affix a piece of red tape to indicate that the cylinder is empty.

121 Transport the empty cylinders to the cylinder receiving and returning area. Always handle empty cylinders as if they were full (see Step 102).

122 Return the empty transporting cart to the gas storage room.

9. Data Input

Data Input requirements for span bottle changes are detailed in TP 205.

10. Data Analysis

Not applicable

11. Data Output

Not applicable

12. Acceptance Criteria

Not applicable

13. Quality Provisions

13.1 Each span gas cylinder must have an EPA content label (green tape sticker) in addition to the manufacturer label.

13.2 The secondary pressure gauge on the regulator must be set at the proper psi.